

**SEQUENTIALLY CONTROLLED AUTOMATIC TRANSMITTER START SYSTEM (SCATS)
CIRCUIT ASSURANCE ARRANGEMENT EA-12271-SD
DESCRIPTION, OPERATION, AND TEST PROCEDURE**

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1. GENERAL

1.01 This section gives a description, the operating principles, and test procedure for the Circuit Assurance Arrangement per EA-12271-SD.

2. DESCRIPTION

2.01 The circuit was designed for use at an outlying station on a SCATS system.

2.02 The primary purpose of the circuit is to provide circuit assurance on a SCATS system inasmuch as outlying station operation is fully automatic for both the sending and receiving portions of the circuit equipment.

2.03 This assurance is provided by visual and audible signals which will operate under numerous conditions of equipment failure at either the outlying station or the control station, and several conditions of line circuit or line equipment failure.

2.04 By combining the selective functions of a 28 TTY and the sequential transmission of Transmitter Start Codes (TSC) with a timing circuit, the alarms will operate if no valid TSC is received within a predetermined period.

2.05 The 28 TTY is arranged so that any valid TSC, comprised of the constant S and a variable A, B, C, etc., will momentarily operate a contact which in turn recycles the timing circuit.

2.06 This recycling of the timing circuit will prevent the alarms from operating, indicating that there is circuit continuity, and that the selective functions of the 28 TTY are operating satisfactorily.

2.07 Assuming the time-out period optionally arranged for four and one half minutes, the alarms would normally operate if a transmission were to extend beyond that period, delaying transmission of a TSC to recycle the timing circuit.

2.08 In the case of such long message transmission, the buzzer will be automatically deactivated, but the lamp will remain lighted until a valid TSC is received.

2.09 Deactivation of the buzzer is effected by receipt of the first SPACE character in text operating a contact in the 28 TTY.

2.10 In case of alarms produced by circuit or equipment trouble, the buzzer can be deactivated by a key. The lamp, as above, remains operated until a valid TSC is received.

2.11 As stated in 2.04, alarm operation is dependent on selective functioning of the 28 TTY and continuous properly timed transmission of TSCs, so that any malfunctioning of the 28 TTY or nonreceipt of TSCs will operate the alarms.

2.12 Examples of such malfunctioning would be as follows.

- (a) 28 TTY selective mechanism trouble.

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- (b) 28 TTY ALS contact or stuntbox contact failure.
- (c) Power trouble such as 28 TTY motor, power lead, power switch off or in trouble.

2.13 Possible causes for nonreceipt of TSCs are as follows.

- (a) Failure or willful stopping of the polling equipment at the control station.
- (b) One way failure or close down of line facilities.
- (c) Repeater equipment.
- (d) Circuit cut condition.

2.14 The circuit equipment consists essentially of the following.

- | | |
|---|---------------------------------------|
| 1 — Y Relay | } Used for control circuit operation. |
| 10 — U Relay | |
| 1 — 280A Relay | |
| | |
| 1 — 376B Vacuum Tube (With associated capacitors and resistors for time-out operation.) | |
| | |
| 1 — Transformer | } For alarm operation. |
| 1 — Buzzer | |
| 1 — Key | |
| 1 — Lamp | |
| | |
| 1 — 3-Function Lever SOP | } For 28 TTY operation. |
| 1 — Contact Assembly | |

Note: Where 376B tubes are used, observe precautions covered in Section 024-700-801.

2.15 The control circuit equipment is mounted in a ED-91472-011 cabinet.

2.16 The ALARM lamp and key are mounted on one side of the 28 TTY while the buzzer is mounted at the customer's direction. Power is obtained from the rectifier of the station control circuit per EA-10963-SD.

3. THEORY OF OPERATION

3.01 Under normal operating conditions, with transmissions of 1-1/2 to 2 minutes or less, and using a time-out period of 4-1/2 minutes * operation is as follows. With the character (*) an optional time-out period of 3 minutes is available.

3.02 With a transmission in progress, the time-out circuit is charging for the first of three 90-second periods.

3.03 At the completion of the normal short transmission and a few seconds thereafter, a TSC will be transmitted from the control station.

3.04 This TSC, momentarily operating the ALS contact in the 28 TTY, will operate AL relay which furnishes a ground to discharge the capacitors in the timing circuit. The time-out circuit is now in condition to recycle.

3.05 Under the above operating condition, neither the visual nor audible alarms will operate.

3.06 In the case of any of those conditions listed in 2.12 and 2.13, both alarms should operate.

3.07 The alarm conditions are effected by means of a count circuit associated with the time-out circuit.

3.08 After 90 seconds the time-out circuit will be sufficiently charged to cause the vacuum tube to become conductive, furnishing current to start a relay chain action. This chain action will discharge and deactivate the time-out circuit, at the same time preparing relay action for the second 90-second period.

3.09 The time-out circuit again charges, and the chain action proceeds as before while preparing relay action for the third time-out period.

3.10 At the end of the third time-out period, approximately 4-1/2 minutes, relays have been activated which will operate the alarms.

3.11 As stated before, the buzzer can be deactivated by a key. The lamp will remain operated until a valid TSC is received.

4. TESTS

4.01 To test the control circuit, co-ordination is required with the Serving Test Center (STC) due to the automatic features of the equipment.

4.02 The station tester should first obtain a release of the equipment if tests are to be made during service hours, then have the STC terminate the station in a dummy or test circuit.

4.03 Assuming that the control station's automatic polling equipment is not available for tests, it will be necessary for the STC to transmit TSCs manually.

4.04 A valid TSC would be FIGS H LTRS
FIGS * S LTRS. The character designated (*) will be an individual valid station code.

4.05 At the station under test, place the 28 TTY in "operating" condition. With the circuit idle both visual and audible signals should operate after approximately 4-1/2 minutes.

4.06 Request the STC to alternately transmit valid TSCs and short test sentences.

4.07 The visual and audible alarms should be deactivated and remain in that condition as long as the TSCs and short test sentences are being received.

4.08 Request the STC to transmit numerous TSCs followed by a long message, (more than five minutes) followed by more TSCs.

4.09 The visual and audible alarms should operate after about 4-1/2 minutes of the test tape transmission. The audible alarm should deactivate automatically on receipt of the first SPACE character received during text while the visual signal remains operated until receipt of a valid TSC.

4.10 At the station under test, turn off the power of the 28 TTY while the STC is transmitting valid TSCs and short test sentences.

4.11 Both visual and audible signals should operate and remain operated until power is restored to the 28 TTY.

4.12 The tests covered in 4.10 and 4.11 should be adequate to cover the three possible power conditions mentioned in 2.12.

4.13 Halting of the transmission of TSCs and short test tapes by the STC as covered in 4.06 is the equivalent of those possible troubles listed in 2.13.

5. REFERENCES

5.01 The following are EA drawings related to this section.

EA-10669-CD — Sequentially Controlled Automatic Transmittter Start System (SCATS)

EA-10720-CD — MXD Timing and Control Circuit

Note: For information on basic 28-type teletypewriter apparatus, refer to standard instructions covering the particular component needed.